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(54) Store and forward system

(57) A terminal, intended in the main for home use, but with business applications, provides a number of communications facilities. It is connected to a transmission medium, e.g. a LAN, and has a store (13) for incoming intelligence. This can be data, speech, video, etc., and on reception is coded in a coder (18) for storage in the store (13), from which it is read out as required for use, e.g. via a TV set (16) or the display part of a central control (12). Intelligence can be stored and transmitted at low traffic, and hence low tariff, times.

The central control (12) can feed intelligence in both for transmission of local data, and for control and request purposes when receiving data.

Fig. 2.

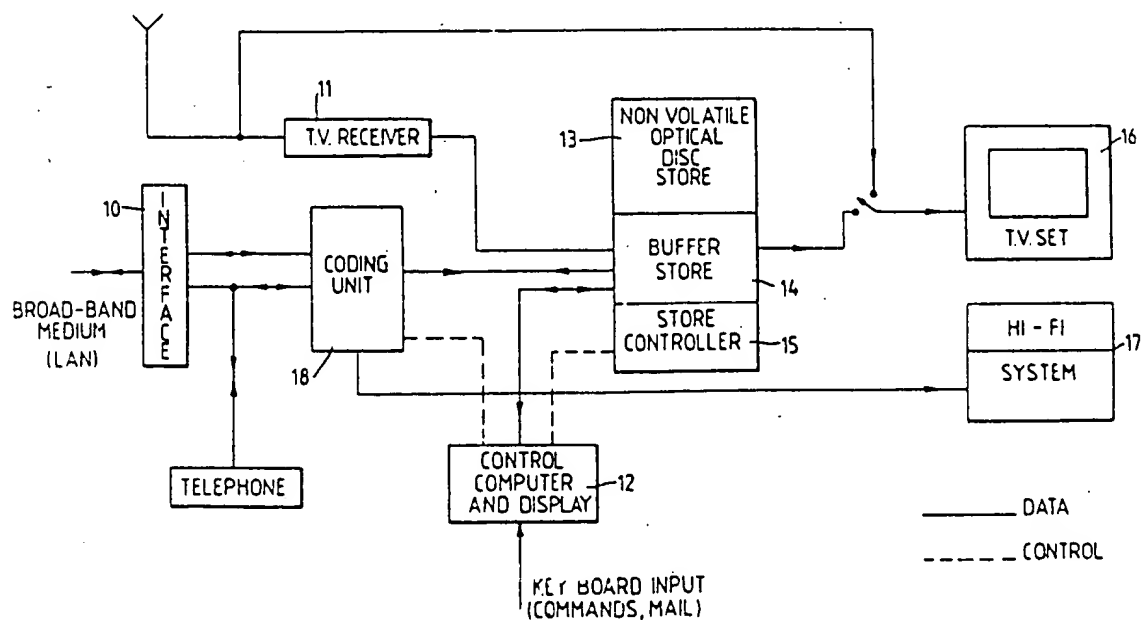


Fig.1.

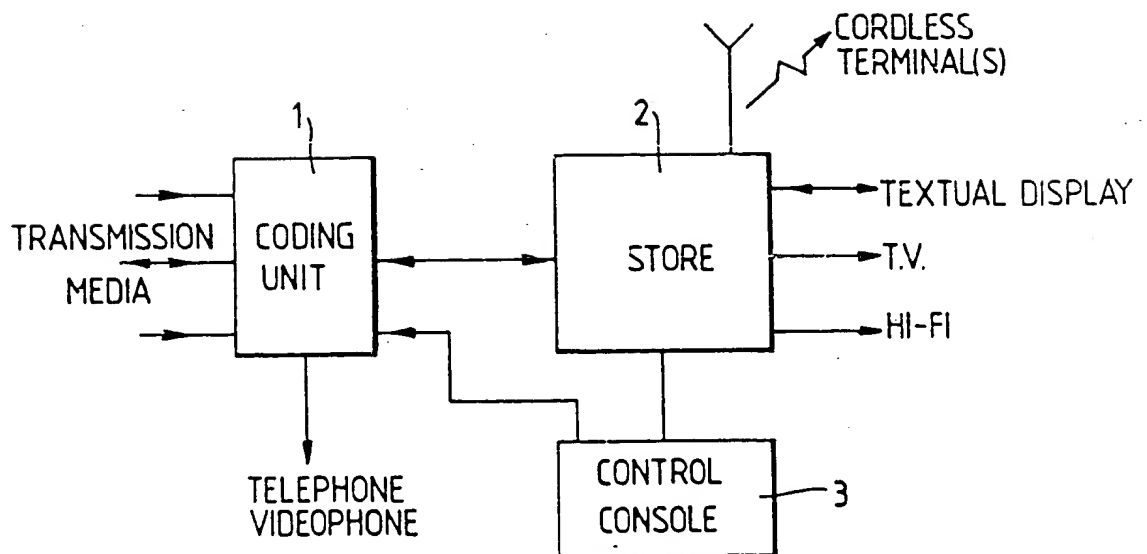
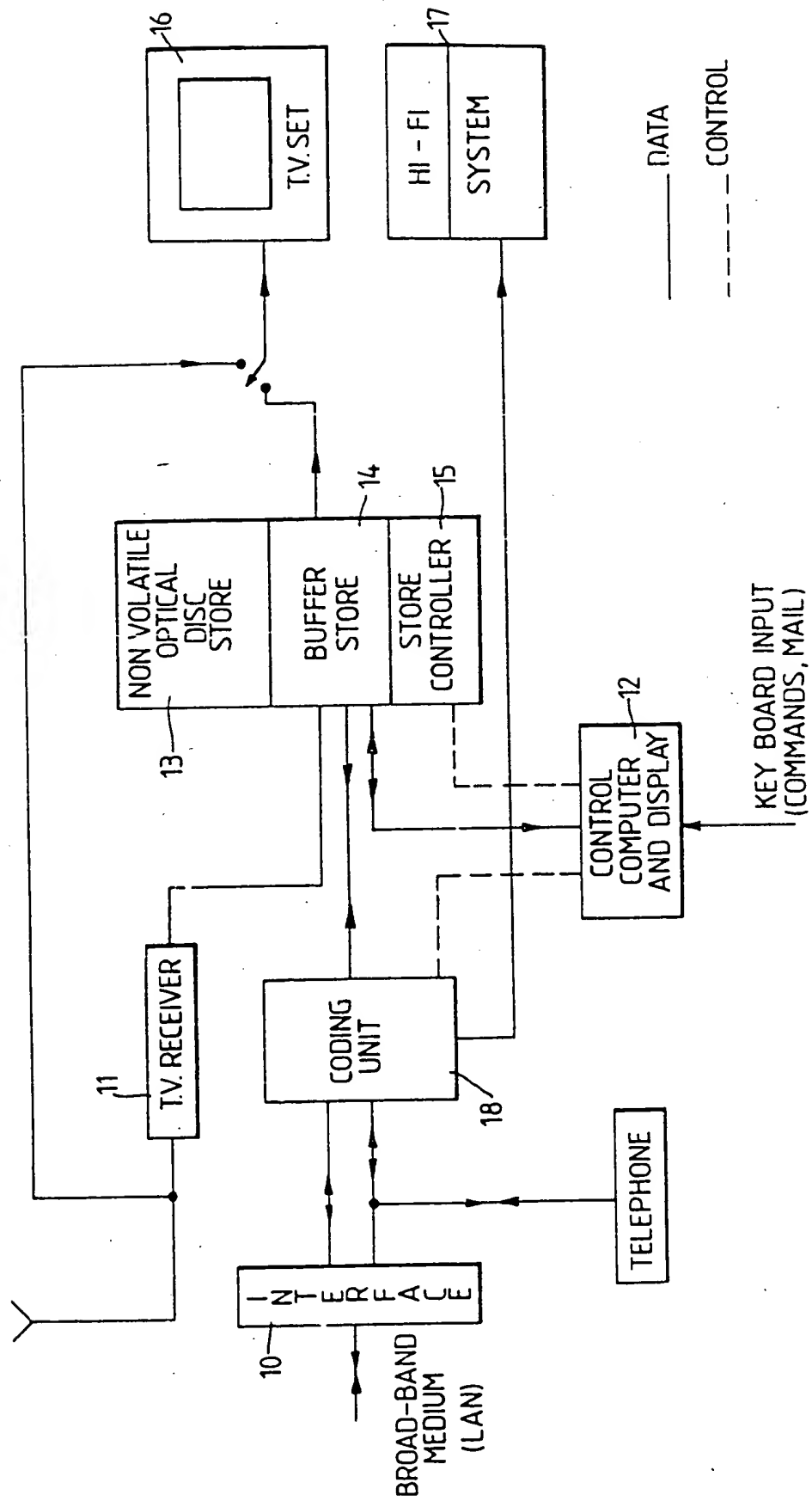


Fig. 2.



SPECIFICATION

Store and forward system

5 The present invention relates to an intelligence handling system of the "store and forward" type, designed in the main for use in the home, but also with business applications.

In our British Patent Specification No. 1556374

10 (C.P. Sandbank et al 53-3-2-1-1) we have described a system in which typewritten messages are coded, stored in the memory of a processor, and transmitted over the public telephone network at times, e.g. during the night, when reduced call charge rates apply. Received messages are stored and after suitable decoding fed back to the typewriter for print out at some convenient time after the transmission period has ended. This is described for an "electronic mail" system.

20 An object of the present invention is to extend the general principles of the above system to provide a more flexible and economical system.

According to the invention there is provided an intelligence handling system, which includes an interface via which the system may be connected to a transmission medium or to a plurality of such media both for sending and receiving intelligence, a coding unit to which the interface is connected, storage means to which the coding unit is connected so that intelligence received via the interface after it has been coded into a format suitable for recording in said storage means is recorded therein, said coding means also being able to code intelligence from the storage means into a format suitable for

35 transmission over the appropriate said transmission medium, one or more intelligence utilisation devices, e.g. a video display and/or a high fidelity system, to which intelligence may be applied from the storage means after having been coded by the coding unit into a format suitable for the utilisation device or devices, and control means for the system whereby the transfers of information to and from the storage means, the interface and the utilisation device or devices and the sending and receiving of intelligence via the transmission medium or media is controlled so that, inter alia, transmission and reception can be effected at low traffic times, and so that intelligence from one or more local sources can be inserted into the system for local use and/or for transmission via the medium, wherein said storage means is used to store intelligence of a number of different types, and wherein said storage means also acts as a buffer enabling intelligence rates to be changed between reception thereof in the storage means and transmission thereof therefrom.

An embodiment of the invention will now be described with reference to the accompanying drawings, in which Figure 1 is a highly schematic representation of a system embodying the invention, and Figure 2 is a more detailed block schematic of such a system.

The system to be described has a transcoder and multi-service information store primarily for use in the home but with possible business applications. It assumes either direct access from the home to a

relatively low speed digital service (e.g. IDA) or to a broad-band analogue or digital connection (e.g. by cable TV or satellite). In Figure 1, there is an interface from a transcoder 1 to the transmission medium, to a data store 2, and a control console 3, and interfaces to specialised equipment. These interfaces are not shown separately from the blocks 1, 2 and 3 in Figure 1.

With such a system, incoming information received via a transmission medium at night (when tariffs are low) is down-loaded into the system according to program. Information can readily, if in digital form, be down-load at bit rates lower or higher than that necessary to replay it. For example high quality music can be transmitted at 64Kb/s and be recoded for play back at a much higher digital rate, or it could be directly recorded within the store 2 as high quality material in analogue form. Similarly digital, facsimile, teletex, videotex can carry written material e.g. newspapers, journals, books and mail. The down-loading of home videos is also possible but even using the full 128Kbits/s bandwidth of ISDN and bit rate reduction schemes this is a time consuming process but is viable when broad-band access is available (e.g. with cable TV).

The store 2 contains various storage media providing outputs compatible with home equipment which could include:

- (a) TV compatible tape or read/write disc
 - (b) Audio storage media compatible with high fidelity equipment
 - (c) Display screen compatible digital storage for page display (stills) of alpha numerics and graphic material.
- Connections to non-portable items is normally by cable, but connections to portable equipment (e.g. hand-held displays) can use broadcast (e.g. infra red or very low power radio).

Provision is made for fast bulk transfer of page display material from the store 2 into a store in, for example, a portable display so that that equipment could be used remotely (e.g. in the train on the way to work).

The function of the transcoder 1 is to translate the data as received via a transmission medium into the form necessary for storage in and replay from the store 2. The control console 3 allows the set-up of communication with the data provider and arranges delivery of the items at agreed times and prices. This offers great flexibility as the user can, for example, decide to change, cancel or enhance his order. For example if he knows that a certain "newspaper" will have an item of special interest the next day he can order it on the spot. The control console 3 instead of being purpose built can be a home computer programmed to perform the control function, and its backing store is then interfaced to the store 2 to provide one form of storage media.

Although the majority of data is transferred "downstream" (i.e. into the home) there is also a need for an upstream capability for control, the dispatch of electronic mail and to provide access into the telecommunication network as a whole. Control is from the control console 3 and the dispatch of electronic mail involves storage in a store 2 with a

view to dispatch in a favourable tariff period. The telecommunication functions (e.g. telephone, videophone) in either direction by-pass the store 2 but that store can have a message recording and answer phone capability which would be switched in on a time delay or by manual means. The recording facility could also be invoked during a call, particularly a videophone call, to record key information to be studied later at leisure.

The function of the transcoder 1 is to interface to one or more of the following transmission media:

- (a) conventional analogue telephone
- (b) digital IDA at rates of 64kb/s or higher
- (c) broad-band entertainment services such as provided by cable TV or satellite
- (d) broad-band (greater than 2Mbit/s) telecommunications services either sharing media with entertainment services or separate
- (e) wide-band (up to 2Mbit/s) telecommunications services
- (f) TV and radio broadcasts
- (g) Local area network (LAN)

The transcoder can recognise the nature of incoming information and take action either to:

- (a) Recode it as necessary and pass it on to the appropriate storage device. Where bandwidth reduction techniques are used for transmission purposes (e.g. videophone or facsimile) the transcoder can, when the economics justify it, contain the decoding equipment that restores the information to its original format.
- Alternatively decoding can take place on output from the store or at the relevant terminal.
- (b) Switch it straight through to the appropriate "real time" terminal (e.g. TV receiver, videophone)

The transcoder also contains the necessary interfacing functions to the media, for example ISDN interface equipment, and conversion equipment to enable cable TV signals to be accepted by a standard television receiver.

For upstream information the transcoder performs any of the reverse transcoding and interfacing functions that are necessary.

Control interfaces are provided to control the routing of information between real time and storage operation. One such control interface is from the central console 3 but there may be provision of others from various items of terminal equipment.

The function of the store 2 is to retain in a non-volatile form the information received via the transcoder 1 for subsequent replay to the appropriate terminal equipment. A means of controlled erasure of selected items of information is provided. The use of storage media with archival capability (e.g. tape or disc) is optionally available.

Interfaces are provided to the transcoder, to the control console, and to the terminal equipment. The latter are either wired or cordless.

Terminal equipment includes but is not limited to TV receivers, high fidelity sound reproduction systems, text terminal (receiver only on both ways), facsimile terminals (receiver only on both ways), and portable terminals.

By recording information at different speeds or rates from that used on replay, the store is used to

match the information rate of the transmission media to that of the terminal equipment. Thus if a transmission medium's bandwidth is limited the information can be replayed at a higher rate than that at which it is received or if the limitation is the terminal, the transmission channel can be fully utilised to achieve a lower delivery cost and the information replayed at a lower rate than that at which it is received.

The control console contains a keyboard with a standard set of alpha-numeric keys plus special functional keys. Control is exercised through this keyboard to record, replay, erase and archive information stored in the store media. For recording the control function has access to a real-time clock. Messages and mail can be entered via the keyboard for real time both-way interactive operation or for recording in the store for subsequent dispatch. Control is exercised on the store and on the transcoder both direct and via the store.

There are many means by which the system described above may be realised which range from a completely purpose built design to one assembled almost entirely out of proprietary "modules". Preferably a design will be a compromise between these two extremes.

For example the control console, as already indicated might be realised using a proprietary home computer, the home computer's own non-volatile storage medium being part of the store block in Figure 1 but additional interfaces would be provided to other storage media (e.g. video analogue storage). The control console function might be in an office workstation which might also have integrated telecommunication features.

The store might contain a proprietary video tape recorder with a "remote" control interface. The store might also contain proprietary floppy disc drives or tape units.

The transcoder might consist of a set of interface and transcoding modules some of proprietary design and others purpose built.

However, it is anticipated that economies will be achieved by sharing power supplies and housings between the modules and that the need to provide compatible interfaces between proprietary modules will lead to a minimum "core" or "harness" of purpose built hardware.

Rather than having different storage media depending on the type of information to be stored, the longer term aim is to have a single medium capable of multi-service storage and this would imply a purpose built device. One possibility is to use a standard video player to store computer programs.

Figure 2 is a more detailed block diagram of an embodiment of the invention. A home installation is connected via an interface 10 to a broadband LAN which provides telephone, data and broadband services (e.g. pay TV). This is a standard interface 10 which can multiplex and demultiplex the services to and from the medium. A TV aerial or satellite dish is a second input medium, using a TV receiver 11. A third type of input comes from the home via the control console 12. From the control console 12 commands can be entered to record programmes or to play back

recorded programmes, data or voice messages. Information can be entered for storage and subsequent dispatch, filed information can be retrieved.

- 5 There is a common non-volatile store 13 for all the information and this is anticipated as being a read/write optic or magneto/optic disc but a magnetic medium is also a possibility. In this example the types of information that might be stored in the common store could consist of:

- 10 (a) TV programmes received via the broadband LAN or off-air
 (b) Videos or films
 (c) Textual material in the public domain (e.g. books, periodicals)
 (d) Telephone messages
 (e) Mail incoming and outgoing
 (f) Music
 (g) Files

- 20 In order that the store can hold a multiplicity of information of diverse types a transcoding function is used when that function is not already built into a terminal or the storage equipment. For example in the owner's absence, the system can be programmed to act in an "answer phone" role and the voice messages may need to be recoded into a form suitable for storage on the common media and then de-recoded for play-back.

- Associated with the non-volatile disc store is a volatile buffer store 14. This serves two functions; data rate changing and allowing time divided access to the main store 13, enabling several operations as perceived by the user to take place in parallel. Both stores are controlled by a store controller 15, coupled to the central control 12. The store controller 15, under command from the control console 12 or autonomously (as appropriate) manages the sequence of disc accesses and buffer transfers.

- Between the aerial and the store 13, a TV receiver 11 (corresponding to the receiver portion of a video tape recorder) is provided to select and amplify the TV programmes that are to be recorded. Note that the output of the receiver is connected to the buffer store 14.

- 45 The control console has a display which can be used for output of textual material.

- Standard TV sets or Hi-Fi equipment 17 can be connected direct to the store if it provides a compatible output or via the transcoder 18 if it does not. Thus as shown we include a standard TV set 16 which can be "driven" direct from the aerial, or from the buffer store 14. Further, the hi-fi equipment 17 can also be driven from the transcoder 18, as shown, or if desired from the store 13 via the buffer store 14.

- 55 In its home application the system also includes a telephone 18, connected to the interface 10, and also to the transcoder. Hence as already indicated the system can be used to record telephone conversations, and can be used as a telephone answering machine.

CLAIMS

1. An intelligence handling system, which includes an interface via which the system may be

- connected to a transmission medium or to a plurality of such media both for sending and receiving intelligence, a coding unit to which the interface is connected, storage means to which the coding unit is connected so that intelligence received via the interface after it has been coded into a format suitable for recording in said storage means is recorded therein, said coding means also being able to code intelligence from the storage means into a format suitable for transmission over the appropriate said transmission medium, one or more intelligence utilisation devices, e.g. a video display and/or a high fidelity system, to which intelligence may be applied from the storage means after having been coded by the coding unit into a format suitable for the utilisation device or devices, and control means for the system whereby the transfers of information to and from the storage means, the interface and the utilisation device or devices and the sending and receiving of intelligence via the transmission medium or media is controlled so that, inter alia, transmission and reception can be effected at low traffic times, and so that intelligence from one or more local sources can be inserted into the system for local use and/or for transmission via the medium, wherein said storage means is used to store intelligence of a number of different types, and wherein said storage means also acts as a buffer enabling intelligence rates to be changed between reception thereof in the storage means and transmission thereof therefrom.

2. A system as claimed in claim 1, and wherein the intelligence as stored in said storage means is stored therein after it has been coded by the coding means.

3. An intelligence handling system, substantially as described with reference to the accompanying drawings.